THE CLAIMS

1. (Previously presented) A system for improved calibration of an instrument, said system comprising:

an instrument for use in an image-guided operation, said instrument tracked with respect to a reference coordinate system during said image-guided operation;

a plurality of fiducials placed on said instrument, said plurality of fiducials enabling measurement of said instrument;

a sensor for measuring said instrument, said sensor capable of being positioned with respect to one or more of said fiducials for measurement of one or more locations on said instrument; and

a tracking system for measuring one or more locations on said instrument using said sensor and said plurality of fiducials in closed form registration to calibrate said instrument, wherein said tracking system compares measurements from said instrument with a model for said instrument to determine a variation based on deformity of the instrument, said tracking system adjusting tracking of said instrument based on said variation,

wherein said tracking system further comprises a feedback mechanism used during surgical navigation to determine accuracy of tracking of the instrument by comparing tracked versus actual instrument position to determine whether positional accuracy is within a certain tolerance and recalibrating the instrument during surgical navigation if the positional accuracy is outside the certain tolerance.

2. (Original) The system of claim 1, wherein said plurality of fiducials comprise at least one of an indentation and a groove.

3. (Original) The system of claim 1, wherein said sensor comprises at least one of an electromagnetic sensor, an optical sensor, an ultrasound sensor, and an inertial position sensor.

4. (Original) The system of claim 1, wherein said sensor and said tracking system comprise a sterile sensor and sterile tracking system.

5. (Canceled).

6. (Original) The system of claim 1, wherein said tracking system compares measurements from said instrument with a theoretical model for said instrument.

7. (Original) The system of claim 1, further comprising a measurement frame for positioning said instrument for measurement.

8. (Previously presented) An improved method for calibrating an instrument, said method comprising:

placing a plurality of fiducials on an instrument;

obtaining a plurality of measurements for said instrument using said plurality of fiducials;

forming a model of said instrument using said plurality of measurements for use in tracking said instrument;

comparing said model of said instrument with a mathematical model of said instrument to determine a variation based on deformity of the instrument;

adjusting tracking of said instrument based on said variation;

obtaining feedback during surgical navigation to determine accuracy of tracking of said instrument by comparing tracked versus actual instrument position to determine whether positional accuracy is within a certain tolerance; and

recalibrating said instrument during surgical navigation if the positional accuracy is outside the certain tolerance.

9. (Original) The method of claim 8, further comprising generating a mathematical model of said instrument.

10-11. (Canceled)

12. (Original) The method of claim 8, further comprising determining a closed form registration of said instrument using said plurality of measurements and said model to calibrate said instrument.

13. (Original) The method of claim 8, further comprising obtaining a plurality of measurements for said instrument after said instrument has been deformed.

14. (Previously presented) A method for dynamic calibration of an instrument for use in an image-guided operation, said method comprising:

obtaining a plurality of measurements for said instrument using a plurality of fiducials on an instrument;

determining a representation of said instrument in a reference coordinate system using said plurality of measurements for use in tracking said instrument;

comparing said representation of said instrument and a computer-generated model of said instrument to identify variation between said representation and said model based on deformity of said instrument;

adjusting said representation of said instrument based on said variation;

facilitating performance of an image-guided operation using an image data set and representation of said instrument;

obtaining feedback during the image-guided operation to determine accuracy of tracking of said instrument by comparing tracked versus actual instrument position to determine whether positional accuracy is within a certain tolerance; and

recalibrating said instrument during image-guided operation if the positional accuracy is outside the certain tolerance.

15. (Original) The method of claim 14, wherein said determining step further comprises determining a closed form registration for said instrument using said plurality of measurements.

16. (Original) The method of claim 14, wherein said obtaining step further comprises obtaining said plurality of measurements for said instrument using said plurality of fiducials and a sensor.

17. (Original) The method of claim 14, wherein said obtaining step further comprises obtaining said plurality of measurements for said instrument using said plurality of fiducials in at least one image of said instrument.

18. (Original) The method of claim 14, wherein said plurality of measurements are obtained in a sterile environment.

19. (Original) The method of claim 14 wherein said plurality of fiducials comprise at least one of an indentation, a groove, and an identifying feature in said instrument.

20. (Original) The method of claim 14, further comprising dynamically updating said representation of said instrument during said image-guided operation.

21. (Canceled)